

Guide for Reading *Puget Sound's Health*



October 2002



PUGET SOUND
ACTION TEAM

Office of the Governor

Guide for Reading

Puget Sound's Health 2002

October 2002

Puget Sound Action Team

Office of the Governor

PO Box 40900
Olympia, WA 98504-0900
(800) 54-SOUND
www.wa.gov/puget_sound

Prepared by **Laurie Spickard** and **Mary Knackstedt**

Special thanks to the teachers and students who reviewed and trial-tested this material:

Joyce Nishimura and her seventh grade students, Woodward Middle School, Bainbridge Island

Arlene Naganawa, Islander Middle School, Mercer Island

Kathleen Heidenreich, Chinook Middle School, Lacey

Maggie Bates, Vancouver School District

This guide is designed to be used with ***Puget Sound's Health 2002***, a report on the status and trends of key indicators of Puget Sound's health. To order copies of the report, see the last page of this booklet. To receive this document in an alternative format, contact the Action Team's ADA coordinator at (360) 407-7300 or the TDD number at (800) 833-6388.

GUIDE FOR READING *PUGET SOUND'S HEALTH*

Puget Sound's Health 2002 was produced by the Puget Sound Action Team, a Washington State government agency that coordinates efforts to protect Puget Sound. A division of the Action Team wrote the document to inform the public about the condition of Puget Sound using 19 key environmental indicators. The publication contains information appropriate for middle and high school students. However, students do not automatically understand how to read and interpret technical documents like *Puget Sound's Health*. As with any skill, reading strategies must be systematically taught in order for students to be successful in fully understanding informational text.

By systematically teaching students to read a scientific document such as *Puget Sound's Health*, teachers can address several Washington State Essential Academic Learning Requirements in both reading and science.

Washington State Essential Academic Learning Requirements in READING

1. The student understands and uses different skills and strategies to read. To meet this standard, the student will:

- 1.3 read fluently, adjusting reading for purpose and material.
- 1.5 use features of nonfiction text and computer software (such as titles, headings, pictures, maps, and charts to find and understand specific information.

2. The student understands the meaning of what is read. To meet this standard, the student will:

- 2.1 comprehend important ideas and details.
- 2.2 expand comprehension by analyzing, interpreting, and synthesizing information and ideas

3. The student reads different materials for a variety of purposes. To meet this standard, the student will:

- 3.1 read to learn new information (such as reading science and mathematics texts, technical documents, and for personal interest)

Washington State Essential Academic Learning Requirements in **SCIENCE**

1. The student understands and uses scientific concepts and principles.

To meet this standard, the student will:

- 1.3 understand how interactions within and among systems cause changes in matter and energy.

2. The student knows and applies the skills and processes of science and technology. To meet this standard, the student will:

- 2.1 develop abilities necessary to do scientific inquiry.

3. The student understands the nature and contexts of science and technology.

To meet this standard, the student will:

- 3.1 understand the nature of scientific inquiry.

This guide offers suggestions on how to present reading strategies that will help students read *Puget Sound's Health* and other technical documents. The guide presents strategies to be applied **BEFORE**, **DURING** and **AFTER** reading the text.

BEFORE, DURING and **AFTER** reading strategies are best completed as a whole group activity for the first two articles "Puget Sound/Georgia Strait" and "Are areas where shellfish can be safely harvested increasing or decreasing?" Some classes will require continued guidance in using the reading strategies for the remainder of the articles in the publication. Other classes will be ready to try additional strategies suggested in the section of this guide titled "Completing the Reading of *Puget Sound's Health*" on page 7.

BEFORE READING

Assess Students' Prior Knowledge

Show students the cover of *Puget Sound's Health 2002*. Encourage them to think about what they have directly experienced, read, or heard in the news about Puget Sound. Have students create a chart:

What I know about the health of Puget Sound	What I learned

Have students work in pairs to record three to four statements about what they already know about Puget Sound's health in the first column of the chart. If they need help with this task, consider distributing local newspapers from recent months and have students search for articles about Puget Sound. News about Puget Sound can also be obtained from the Puget Sound Action Team web site at www.wa.gov/puget_sound.

In a whole-group discussion, encourage students to share what they already know about the health of Puget Sound. Record these statements for future reference. The statements will provide information about students' prior knowledge of Puget Sound as a benchmark.

Reading for a Purpose

Students need to know why they are reading *Puget Sound's Health*. Is this activity part of a unit on Puget Sound or is the purpose to teach students how to read informational text? Determining a purpose provides both a reason and a focus for reading.

Reinforce that *Puget Sound's Health* contains informational text requiring the use of specific reading strategies and thinking behaviors.

Skimming the Text

Preview the text with students to help them become active readers. Ask students:

- **Why is skimming the text helpful before reading?**

Asking this question will reveal students' sophistication with skimming as a pre-reading strategy. To help students begin asking questions and forming opinions while skimming, focus on the text features discussed below. Help students use the label "text features" when identifying and making use of text features to inform their understanding.

COVER

- What do the pictures indicate? Explain.
- Call attention to the words "status," "trends" and "key indicators" in the subheading. Discuss the meaning of these words in reference to the kind of information that will likely be included in the document.
- Who wrote this publication? Where will we be able to read about this Team and their credentials to write about this topic?
- Who is the intended audience? Explain.

INTRODUCTORY PAGE (PAGE 2)

- Where do your eyes focus when previewing this page? Why do you think this happens? Why do the authors want us to see this part first?
- How is the table of contents structured? How might this structure help us read and understand this material?

BODY OF THE TEXT (PAGES 3 –16)

- How is the text organized in each article? Is this consistent throughout the publication?
- What other text features have been included? How might they help us read the text?
- What do the maps, graphs and charts tell us?
- What unfamiliar words stand out?

BACK PAGE

Encourage students to examine the photographs on the back page of *Puget Sound's Health 2002* and discuss what they mean. Why were these photos chosen for this page?

Have students read the article titled, "What can you do?" Put students in groups to brainstorm ideas for photos to illustrate the list of 10 simple things.

Develop a List of Questions

After skimming the material, have each student record one question he or she has about the health of Puget Sound. Display the questions and discuss them as a whole group. Group and classify the questions. Does the question address the health of a particular species? Does the question pertain to water quality? Keep these questions posted for reference as reading proceeds.

DURING READING

Teacher-led Reading

Read the first article, "Puget Sound/Georgia Basin," aloud. To help students construct meaning, discuss the material as it is read. Pose these questions while reading the text.

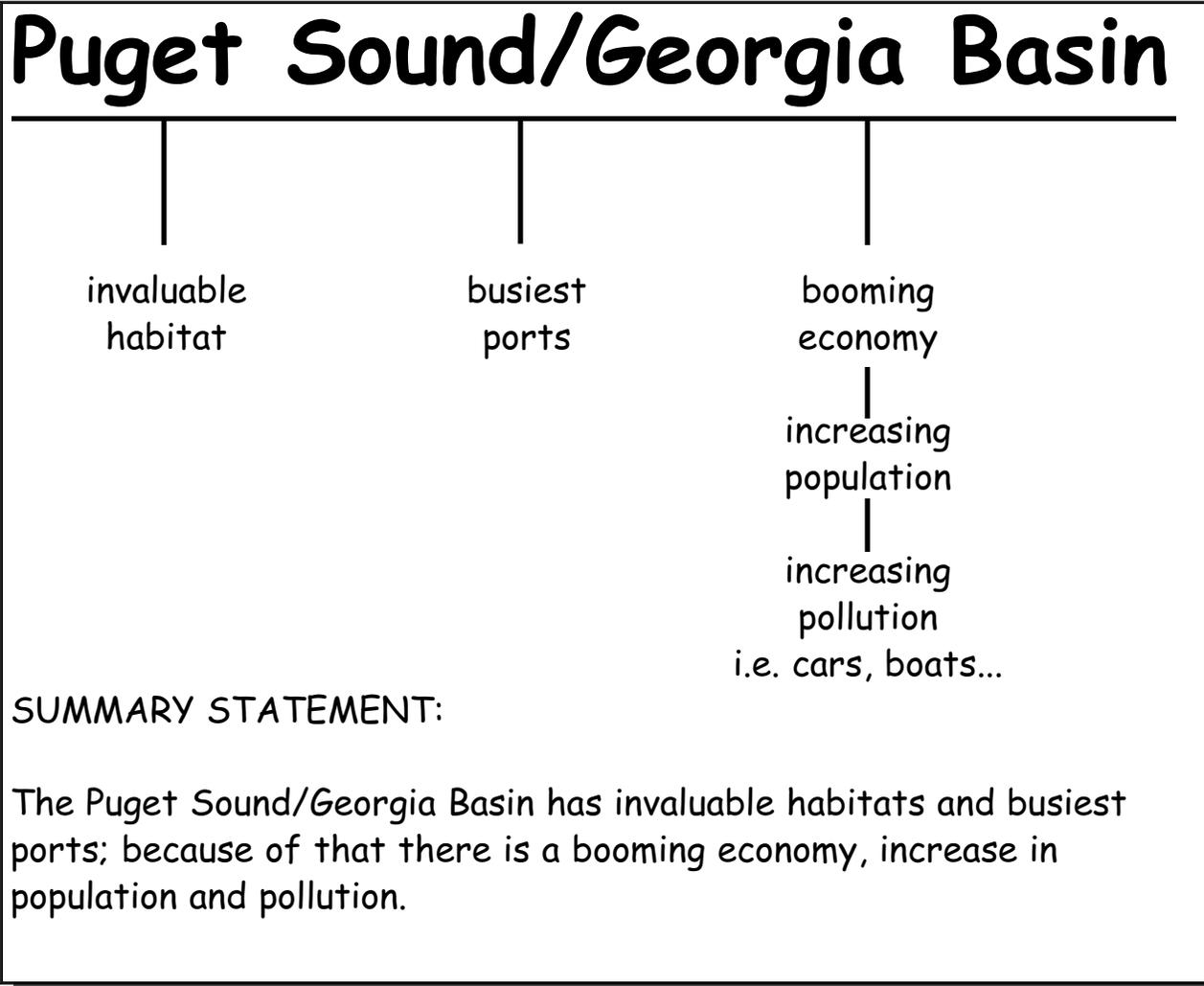
- What new questions do you have as the text is read? Post new questions as they are generated, adding new categories as necessary.
- If something we read is not totally clear, what strategies could we try?
 - ~ Keep reading
 - ~ Go back and reread
 - ~ Use context clues including illustrations
 - ~ Adjust reading rate. Informational text like *Puget Sound's Health* needs to be read at a much slower rate than narrative text.
 - ~ Look up new vocabulary or determine the meaning from the context and record definitions.
- How do the graphs and charts help us understand the material?

See **Reference Sheet #1, Understanding Graphs** (Page 10 in this guide) for teaching hints. Have students write their own interpretations of a graph followed by a whole-group discussion.

Identifying Organizational Patterns

Identify *Puget Sound's Health 2002* as expository writing. Its purpose is to inform the reader about the health of Puget Sound. Explain that expository writing can be organized in many ways. **Reference Sheet #2, Types of Non-Fiction** (page 15) identifies several of these organizational patterns. After reading "Puget Sound/Georgia Basin," show students Reference Sheet #2. Explain that the article contains two organizational patterns. The article begins by following the pattern of "Ideas with Supporting Details" and ends in a "Cause and Effect" pattern.

Point out to students that each organizational pattern of expository text has a corresponding graphic organizer that is useful for taking notes. Work with students to create a table graphic organizer for **Main Ideas with Supporting Details** and moving to a **Cause and Effect** organizer for "Puget Sound/Georgia Basin."



AFTER READING

Summarizing Key Points

Explain to students that it is important to summarize what they have read. This reflection time increases understanding. Discuss the text with students. The following questions may be useful for discussion:

“Puget Sound/Georgia Basin”

- Where are these two bodies of water located? Why have they been linked in this article?
- Why are Puget Sound and the Georgia Basin important?
- What is happening to this region?
- How fast is the Puget Sound region’s population growing?

“Are areas where shellfish can be safely harvested increasing or decreasing?”

- Why are shellfish harvest areas a good indicator of Puget Sound’s health?
- What is the status of commercial shellfish growing areas?
- What is the status of recreational shellfish harvest areas?
- How are shellfish growing areas classified?
- What are the main sources of contamination for shellfish growing areas?
- Describe the changes or trend in harvestable acres of shellfish since the 1980s.

***Reference Sheet #3, Questions for Discussion After Reading on page 18 of this Guide includes additional discussion questions for the remaining sections of *Puget Sound’s Health*.

Writing a Summary Statement

After discussion, write a summary statement. Answer the following questions.

- Which note-taking organizer did we use? Why was this graphic organizer selected? How could we use the graphic organizer to write a summary statement?
- Why would it be useful to use the subheads in the summary statement?

COMPLETING THE READING OF *PUGET SOUND'S HEALTH*

After reading the first two articles with your students, if you think they are ready to work more independently on the rest of the publication, try one or more of the following techniques:

► Jig Saw

Divide students into groups of six people. Explain the jigsaw activity. Each student in the group will break off and go to another group. This new "expert" group will read and analyze one article in *Puget Sound's Health*. Students then return to their original group to present and summarize the most important information about the article they read.

Before grouping students into the expert group, review some of the reading strategies. Ask students:

- What reading strategies did we use while reading the text of Puget Sound/Georgia Basin? Which seemed to work the best? Why?
- Were any of the text features particularly helpful in understanding the material? Explain how they helped.
- State expectations about what students should record for each article presented. For example, should students include the graphic organizer they used? Is a summary statement for each article expected?

► Student Expert Groups

Divide students into small expert groups. Assign each group one of the remaining sections of *Puget Sound's Health* to read. Explain that each group will present their section to the rest of the class.

Each expert group will use the reading strategies to read and understand the text. Distribute the appropriate discussion questions on Reference Sheet #3 to each group or have them come up with their own. A working framework may be useful for students. **See Reference Sheet #4, Expert Group Presentation Outline** on page 19 of this Guide for a sample.

The completed outline can be used for the presentation to the rest of the class. Encourage the use of visual aids during the expert group presentations.



Slide from student PowerPoint presentation of *Puget Sound's Health*.

Created by Joyce Nishimura's 7th-grade class, 2001, Woodward Middle School.

GOING FURTHER

Checking Understanding

After reading all of *Puget Sound's Health*, have students examine the recorded statements about what they knew about the health of Puget Sound before they read the text in depth. Have students complete the chart by recording what they learned from reading the publication.

<u>What I know about the health of Puget Sound</u>	<u>What I learned</u>

Have students analyze each statement on the left side of the chart by placing a "+" or a "-", depending on whether it was confirmed or negated by their reading. If some of their statements were not addressed by *Puget Sound's Health*, discuss how they might research the topic.

Continued Research

Return to the student-generated questions about Puget Sound. Can more of the questions be answered? Do some of the categories of questions need clarification? Challenge students to seek the answers for the questions that remain unanswered.

Ask:

Does this publication provide help for where we might go to find additional information about the topics addressed?

The contact list of member agencies listed in the side bar on page 3 of the newspaper may be a good place to start. Discuss which agencies would be best to help answer a question still under investigation.

General Public Surveys

Have students create and conduct surveys about the public's perception of the most important issues facing the health of Puget Sound. Present the results in a school newspaper or in a local community paper.

Creating a Report Card for Puget Sound

Scientists attending a recent Puget Sound Research Conference entertained a question similar to: "Is the news about the *Puget Sound's Health* generally good news or bad news?" Think about this question. Imagine that you are a science reporter for one of the large urban newspapers in the area. What would you write after reading *Puget Sound's Health*? Create a report card for the health of Puget Sound that the general public will be able to read and understand. You may choose to write using the persuasive mode of writing. Refer to **Reference Sheet #2** for information on this kind of writing.

30-Second Spots

Challenge students to create 30-second spots or public service announcements to educate a selected audience about the health of Puget Sound using the information presented in ***Puget Sound's Health***. Identify where these spots could appear—on school announcements, school telecast, in the school paper, local cable network, etc.

Evaluation

Ask students the following questions:

- What was the most important reading strategy you learned to increase your understanding of difficult text?
- What was the most important thing you learned about Puget Sound? Why was it important to you?
- What additional questions do you have about the health of Puget Sound?

REFERENCE SHEET # I

Understanding Graphs, Charts and Maps

Graphs and charts show how pieces of information are related. Different types of graphs are used to show different kinds of relationships. Like the old saying “A picture is worth a thousand words,” a good graph can make complex information understandable at a glance. Note that the graphs, charts and maps used in *Puget Sound's Health* came from a variety of sources. Many of the graphs in the publication include time on the horizontal axis and are located in the “trends” section of the publication. Discuss with students why graphs are a useful tool for identifying and understanding trends.

A chart is information presented in the form of a picture. The information in a chart is usually called data. Included here are graphs from *Puget Sound's Health* that represent the most common types that students will likely encounter.

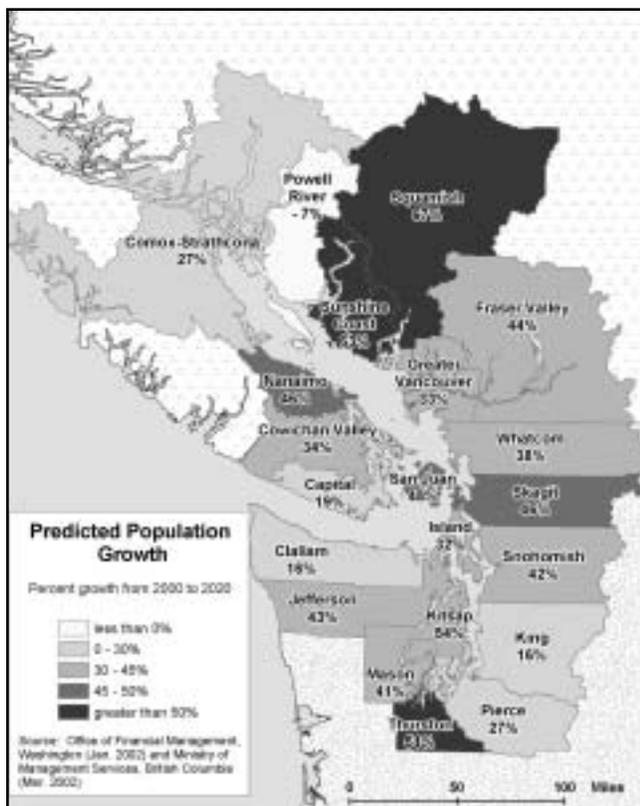
► Maps

The Essential Academic Learning Requirements in Geography direct that “The student uses maps, charts, and other geographic tools to understand the spatial arrangement of people, places, resources, and environments on the Earth’s surface.” The EALRs also require that students should be able to “identify the characteristics that define the Pacific Northwest and the Pacific Rim as regions.” Maps in *Puget Sound's Health* help to establish the context for student inquiry into the region.

It is important for students to develop a sense of the Puget Sound basin as the place where they live, its relationship to the Pacific Ocean and mountain ranges, the rivers that flow into it, and its physical and ecological connection to the Strait of Georgia across the border in British Columbia. In addition to establishing location, some of the maps are used to show the position of environmental sites or conditions relating to the health of Puget Sound and Georgia Basin.

Encourage students to look carefully at the graph or map to find:

- The title of the graph or map
- Labels on the axes of a line or bar graph,
- Sections on a pie graph
- Information in the key
- Source of information—who provided the information?
- Date—how recent is the data?

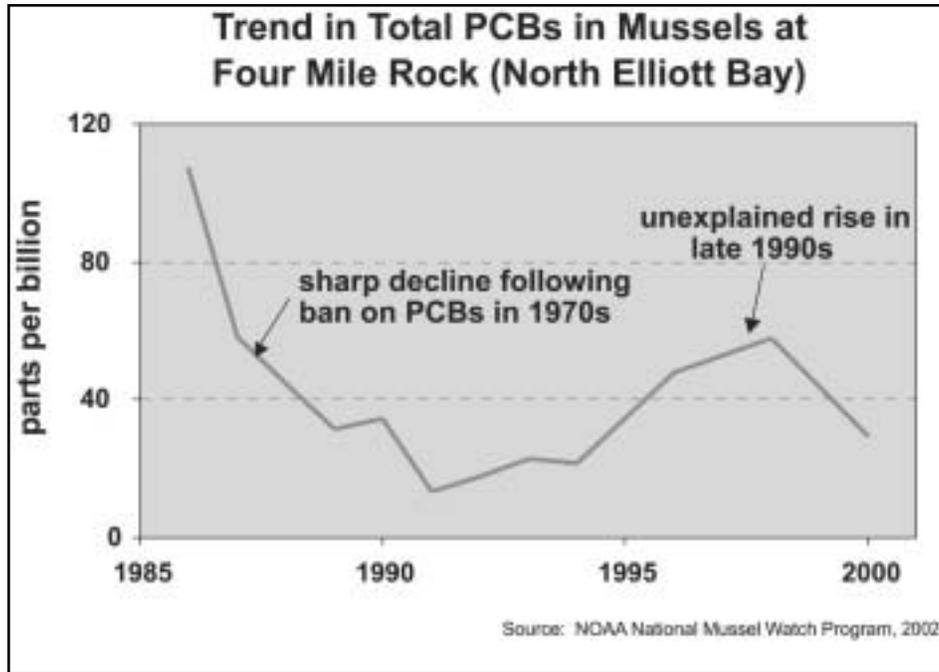


Example: Predicted Population Growth

► Line Graph

Line graphs are useful for showing trends and developments over a period of time. To compare different types of information, sometimes a line graph uses more than one line. To prevent confusion, the lines are usually drawn differently.

Example: Trend in Total PCBs in Mussels at Four Mile Rock (North Elliott Bay), page 8

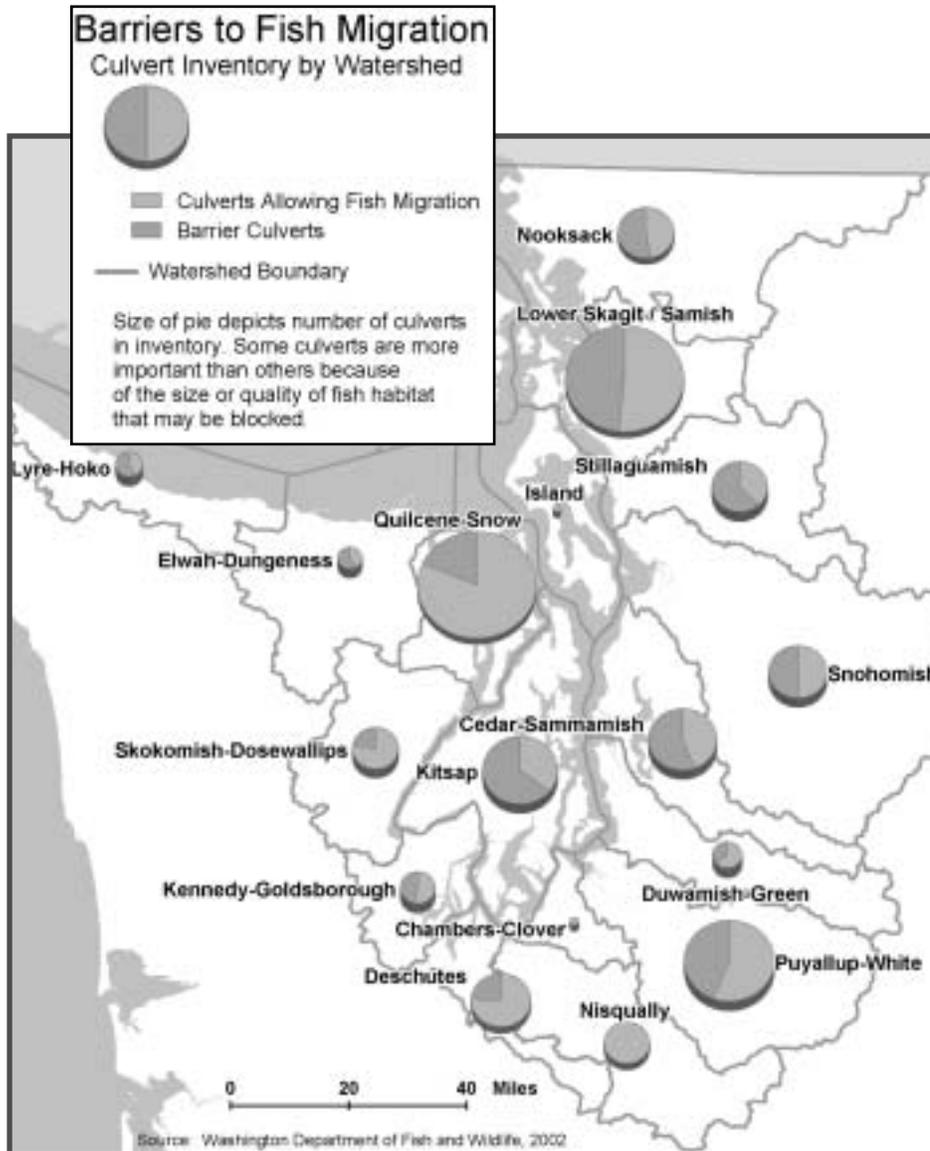


What does this graph show about the level of PCBs in mussels from the 1980s to 2001? What caused the sharp decline in the 1980s? What caused the rise in the late 1990s? Why are mussels used to measure PCB levels?

► Pie Graph

A pie graph shows a whole quantity divided into various parts. Each part of the circle is called a segment and has its own value. In most cases, the values show a percentage of a whole.

Example: Barriers to Fish Migration, page 11.



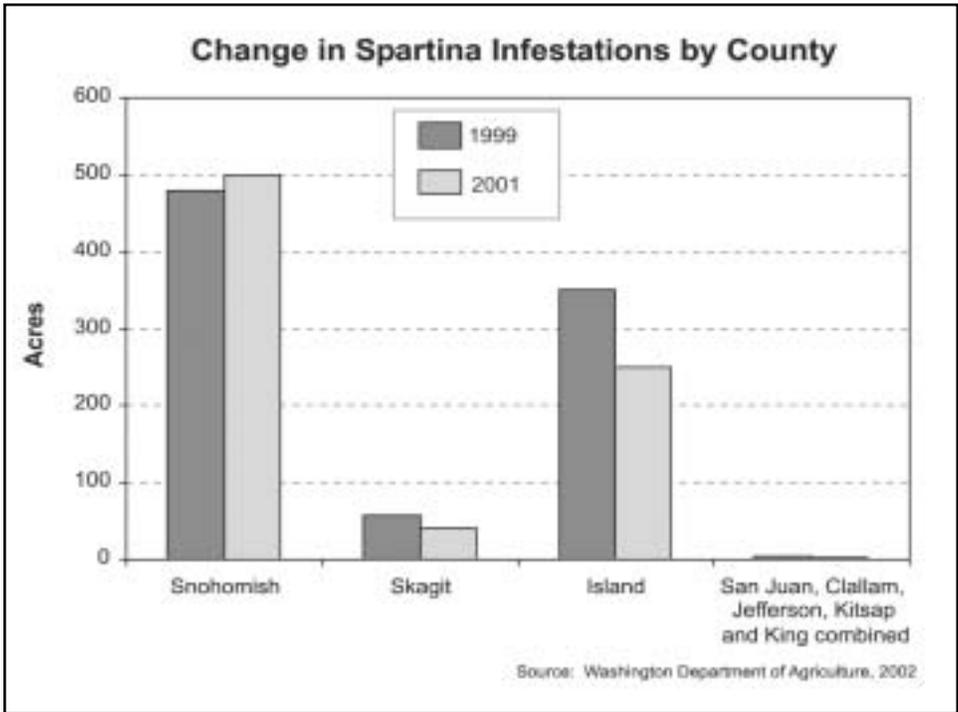
The map includes a pie graph for each watershed in the Puget Sound basin. The size of the pie shows the relative number of culverts in the inventory. The right side of the pie represents culverts that allow fish migration and the left side represents the culverts that block fish passage.

Which watershed shows the most inventoried culverts? (Note—the size of the pie does not reflect the total number of culverts, it represents the relative number of culverts that have been identified in the watershed). Of the inventoried culverts in the Snohomish watershed, what percent block fish migration? Which watersheds would likely have the most culverts?

► **Bar Graph**

Bar graphs have labeled points along the horizontal and vertical axes. The value represented by the bar is determined by its height (or length) and by its position along an axis. Sometimes two different bars are shown to compare values.

Example: Change in Spartina Infestations by County, page 13

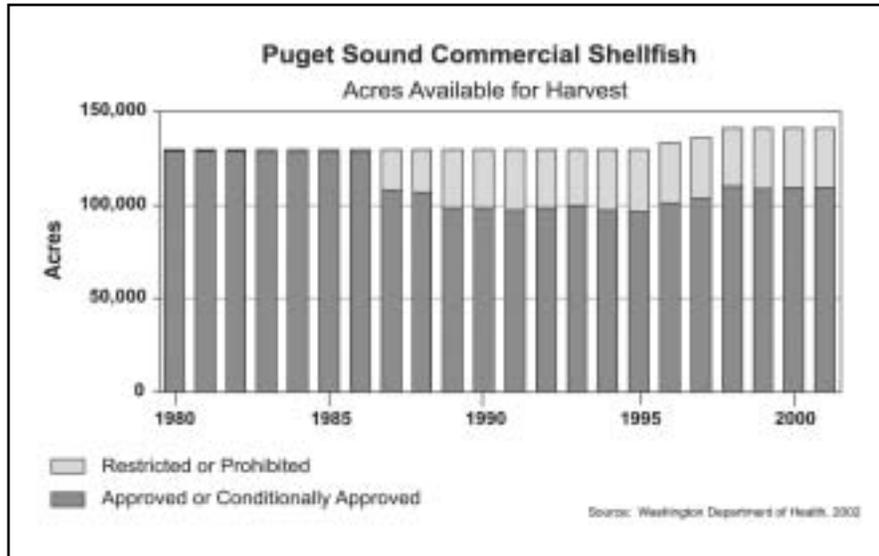


The bar graph compares acres infested by an introduced species called spartina for three counties in 1999 and 2001. Which county shows the largest decrease in infested acres? Which county showed an increase in spartina infestation?

► Stacked Bar Graph

A stacked bar graph divides the quantity represented by the bar into two or more separate sections for comparison.

Example: Puget Sound Commercial Shellfish, Acres Available for Harvest, page 4



This bar graph is stacked to show the relative number of acres that are approved and restricted or prohibited for commercial shellfish harvest. Why do you think a stacked bar graph was used in this application? What changes in acreage approved for commercial harvest have occurred since the 1980s? What changes in restricted or prohibited areas have occurred since the 1980s?

REFERENCE SHEET #2

Types of Non-Fiction

Description

This type of non-fiction focuses on a topic and aspects of the topic that are described in the reading. When previewing you will notice a topic sentence, followed by descriptions of the topic.

TAKING NOTES

A web is a good graphic organizer for this type of non-fiction.

Example: Are fish and wildlife populations increasing or decreasing? Page 14.

Main Idea With Supporting Details

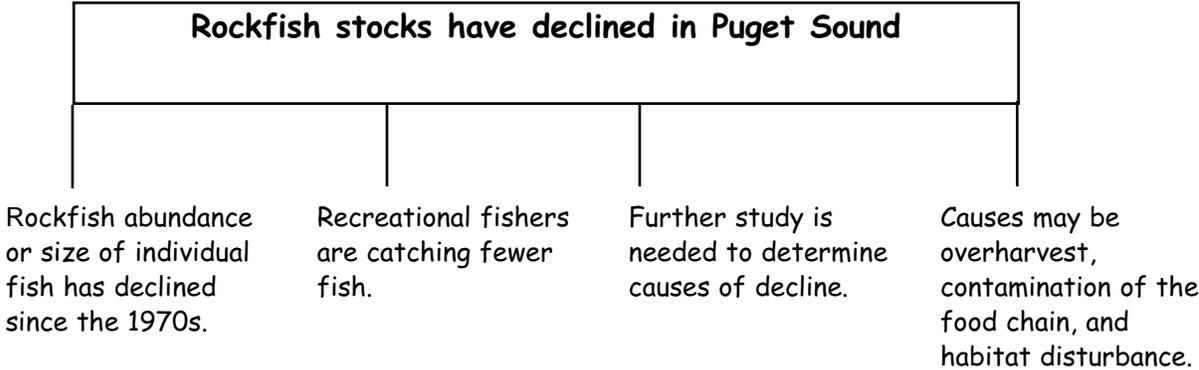
In this type of reading, a heading at the top of the page often introduces the main idea. The first few sentences follow the main idea. The rest of the reading provides details that support the main idea.

TAKING NOTES

A table is a good organizer for this type of non-fiction.

Example: Rockfish. Page 15.

Rockfish stocks have declined in Puget Sound



Process

Non-fiction that outlines steps or stages is written in the process style.

TAKING NOTES

A list is the best organizer for this style. The list should include the important steps or stages in completing the process that is described.

Example: What can you do? back page

1. Make smart growth, not sprawl choices.
2. Keep your boat and our water clean.
3. Watch for and keep nuisance plants and animals out of Puget Sound.
4. Follow fishing and hunting regulations.
5. Use your car less and never pour anything down a storm drain.
6. Keep vegetation and shorelines natural.
7. Use less water.
8. Cut down on fertilizers, pesticides and herbicides.
9. Pick up after your pets and keep animals out of streams.
10. Keep your septic system in tip working order.

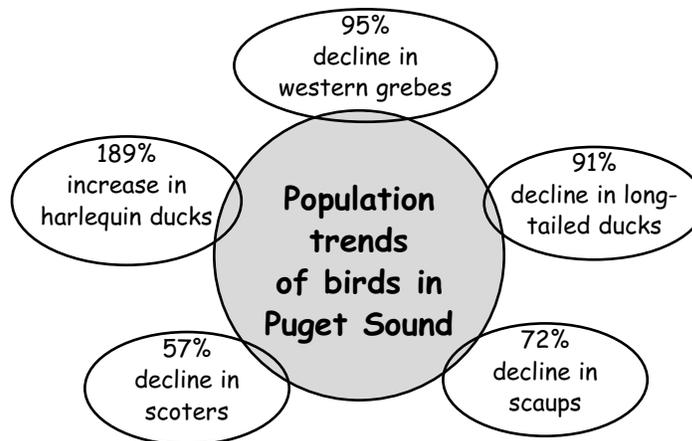
Comparison/Contrast

When some thing is being compared to another, this pattern of non-fiction is called comparison/contrast.

TAKING NOTES

A Venn diagram can be used to compare information or show relationships.

Example: Scoters, page 14



Chronological Order

This type of non-fiction writing includes details that are presented in time order. It may state a date and describe an event, then it will state another date for another significant event. This style provides historical information.

TAKING NOTES

Write your notes in a timeline to show the chronological order of events or trends.

Example: Annual Puget Sound Herring Run, 1975-2001, page 15

(North Sound Herring Stocks)

1970s—between 12,000 & 13,000 tons

1980s—between 6,000 & 13,000 tons

1990s—less than 4,000 to 10,000 tons

2000s—less than 4,000 to ? tons

Cause and Effect

Non-fiction that follows this pattern will describe an event or happening and include a reason or state a probable cause for the event.

TAKING NOTES

To remember important information when reading this style, try an organizer like this:

Example: Why are shellfish harvest areas a good indicator of Puget Sound's health? Page 4

Hypothesis: Shellfish harvest areas are a good indicator of Puget Sound's health.



Shellfish feed by filtering large quantities of water.



They accumulate bacteria, viruses, & contaminants from the filtered water.



Shellfish are monitored to provide information about contamination to protect human health.



Changes in contamination of shellfish areas can provide information about land uses that affect Puget Sound's health.

REFERENCE SHEET #3

Questions for Discussion After Reading

Is the quality of **water for recreation** improving or declining?

Why measure bacterial contamination in streams and rivers?

How is the quality of water for recreation monitored?

Are the sizes and frequency of **oil spills** increasing or decreasing?

What are the three sources of oil spills?

What does the state do to prevent oil spills?

Is the area of **contaminated sediments** increasing or decreasing?

Why measure the acreage of contaminated sediments?

What has to be done to decrease the acreage of contaminated sediments?

Name three pollutants of concern and describe their origin.

Is **toxic contamination** of the marine environment increasing or decreasing?

Why do you think that mussels, harbor seals and English sole were chosen to describe toxic contamination in the Sound?

English sole live on the bottom of Puget Sound and are in close contact with sediments. How does this contact affect them?

Is fish and wildlife **habitat** increasing or decreasing?

What limits the ability of eelgrass to survive?

Why have scientists inventoried bulkheads and docks?

What blocks fish passage?

What causes stream temperature problems?

What factors are measured to determine marine water quality?

Are **aquatic nuisance species** increasing or decreasing in Puget Sound?

What human activities provide pathways for the introduction of new species to the region?

Why are nuisance species a concern?

Are fish and wildlife **populations** increasing or decreasing?

Report on the status of each of the species selected as indicators of Puget Sound's health. Why were these species chosen?

Identify what affects the populations of each species.

REFERENCE SHEET #4

Expert Group Presentation Outline

Article read:

Graphic Organizer:

Summary Statement:

Additional Questions:

WE WANT TO HEAR FROM YOU!

The Puget Sound Action Team is interested in receiving feedback from teachers who have used this guide. Please contact Mary Knackstedt at 360-7336 or mknackstedt@psat.wa.gov with your comments or suggestions.

Publications available for educators

Copies of **Puget Sound's Health 2002** are available for educators. If you need copies of Puget Sound's Health or additional reading guides, contact the Puget Sound Action Team at **1-800-54-SOUND**. Electronic versions of **Puget Sound's Health 2002** and this reading guide are on the Action Team's web site www.wa.gov/puget_sound.

Other publications available in hard or electronic copies include:

▶ **2002 Puget Sound Update**

This document is the eighth report of the Puget Sound Ambient Monitoring Program (PSAMP).

This report, like previous versions of the Update attempts to answer the questions of citizens, lawmakers, resource managers and scientists about the condition of Puget Sound's waters and its biological resources. The PSAMP and this Update are organized around five monitoring topics that relate to human and management activities: physical environment, pathogens and nutrients, toxic contamination, human health, and biological resources.

Fact Sheets on Puget Sound:

- ▶ **Monitoring to Assess the Health of Puget Sound**
- ▶ **Puget Sound's Nearshore Habitat**
- ▶ **Public information and Education**
- ▶ **Shellfish Protection Districts**

▶ **Sound Waves**—Quarterly newsletter on water quality protection

▶ **Puget Sound Notes**—Biannual newsletter on scientific research in the Sound

